International Journal of Community Medicine and Public Health
Singamsetty B et al. Int J Community Med Public Health. 2020 Dec;7(12):4833-4838
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20204981

Original Research Article

Assessing the knowledge, skills and effectiveness of e-learning among medical graduates amongst the COVID-19 pandemic

Bhaskar Singamsetty, Sai Venkata Rajyalakshmi*

Department of Community Medicine, Narayana Medical college, Nellore, Andhra Pradesh, India

Received: 28 October 2020
Accepted: 06 November 2020

***Correspondence:**
Dr. Sai Venkata Rajyalakshmi,
E-mail: sujatha2481@gmail.com

ABSTRACT

Background: Introduction of e-learning as a new paradigm in medical education is gaining in the era of COVID-19 pandemic as an alternative to traditional teaching where students and faculty skills are widely required in information and communication technology. Objectives were to assess the knowledge and attitude of medical students in application of e-learning in medical education. The level of satisfaction attained in gaining knowledge and availability of e resources were also assessed.
Methods: A cross sectional online study was conducted for two months at Narayana medical college, Nellore among the medical graduates with a pre designed structured questionnaire after ethical committee approval. The questionnaire was designed to assess the Knowledge and attitude and was closed ended type. The questionnaire regarding level of satisfaction were assessed using 5-point Likert scale. The data was analysed by using SPSS version 17 and p valve<0.05 was considered significant.
Results: Total 200 medical students with 50 in each phase were selected with 42% males and 58% females. Smart phone was the commonest device used (54%). 68.5% were familiar with e-learning in medical education, 55% accessed regularly, 47% were using for assessment with majority in phase 4 students. 81% agreed e-learning definitely improves their overall academic performance and 83% their self-assessment.
Conclusions: Students had positive attitude towards e-learning and accepted supplementation of e-learning in regular traditional teaching method. Majority were satisfied with clinical material provided, knowledge gained in practical and theoretical aspects by online lectures in various formats and professional assistance provided.

Keywords: E-learning, Medical education, Self-assessment, Academic performance

INTRODUCTION

Emergence of Severe corona respiratory distress syndrome by corona virus and declaration of it as a pandemic by WHO has brought the entire world in still affecting economy, education and was declared as global economy. This pandemic has prompted the declaration of "lockdown" by many nations which brought educational activities at all levels to halt abruptly. Amidst the pandemic, as frontline warriors the physicians performed multiple responsibilities of management of cases to educating the future physicians also. In This global emergency health education with no exemption has been existentially challenged.[1]

Introduction of e-learning as a new paradigm in medical education is gaining in the era of COVID-19 pandemic as an alternative to traditional teaching where students and faculty skills are widely required in information and communication technology. Bernard Luskin, pioneer in e-learning describes "e" as exciting, enthusiastic, emotional, education learning where most describes "e" as electronic learning.[2] E-learning is a flexible method of teaching which is learner centred and differs from traditional teaching by the medium which is delivered but also the learning, teaching and assessment approaches used. In a country like India, where resources are very limited it is an absolute challenge to implement this method at various levels including the college and the

student. Affordable medical institutions have adopted their own strategies and innovations with applications like zoom, cisco, WebEx, google classroom etc. This methodology was used not only for knowledge gain but also for completion of course syllabus, to be in touch with students and to gain confidence of students during COVID-19 pandemic.[3]

E-learning is changing from transforming textbooks in electronic format to a truly interactive medium that can be delivered to meet the educational needs of students and postgraduate learners. Advantages of this methodology include ease in updating content, personalized instruction, accountability, ease of distribution and content standardization. This can also improve the efficiency and performance of medical educators I social, scientific and other challenges in skill improvement in using and developing web-based applications. In resource constraint countries and conditions there are many barriers to overcome and feel the gain and advantages of technology-based learning.[4]

Th present study was aimed to assess the knowledge and attitude of medical students in application of e learning in medical education. The level of satisfaction attained in gaining knowledge and availability of e resources were also assessed and compared with traditional classroom teaching.

METHODS

The present cross-sectional study was conducted by department of community medicine in association with department of medical education at Narayana medical college. The study was conducted for a period of two months from June 2020 to July 2020.The study proposal was presented before the institutional ethical committee and all guidelines of the committee were followed during the study period. The study was accepted by the institutional ethical committee. The study was conducted totally online. The information obtained was totally kept confidential and was randomly coded so as to ensure delinking with identity of any student.

Selection of students

Medical students were selected randomly from all the phases of the course by using simple random selection technique. If any student was absent on the date of data collection another student was selected from the same phase randomly to avoid any deficiency in sample size. Students who didn't give consent for the study were not included in the study.

Sample size

A total of 200 students with 50 in each phase (1st phase, 2nd phase, part-I and part-II of final phase) were selected for the study. The students were clearly explained about the study purpose and protocol and informed consent was obtained from all the participants of the study. A prior online introductory session was organized to the study participants explaining the details of the study and methodology of study. The designed pre structured questionnaire of the study was clearly explained to all the participants and the method of marking the answers and doubts if any were clarified during the sessions organized before starting the study.

Questionnaire

The questionnaire prepared for the study was divided into part-A which included the demographic characteristics of the participant and part-B which include knowledge about e learning (applications, software), effectiveness of online teaching in comparison with traditional classroom teaching. The questionnaire on knowledge of e learning was closed ended with yes or no as the options of the questions. The satisfaction levels on effectiveness of online teaching were scored by using 5-point Likert scale from 1=strongly disagree to 5=strongly agree.

Statistical analysis

The collected data was entered in Microsoft excel spread sheet initially for any corrections and later analyzed by using SPSS software version 17. Results were displayed in the form of frequencies and proportions. For calculation of significance chi-square test was used and p value<0.05 was considered significant in the study.

RESULTS

The present cross-sectional study was conducted among 200 undergraduate medical students with 50 students in each phase. Gender distribution of the students was males with 42% and females 58%. The mean age of the total group was 21.43±2.65 years, male students was 22.18±4.84 years and female were 22.84±5.20 years. Majority of the study participants were hostellers with 63 and 37% were days scholars (Table 1). All the students who participated in the study had access to internet facility either by mobile data or wi-fi.

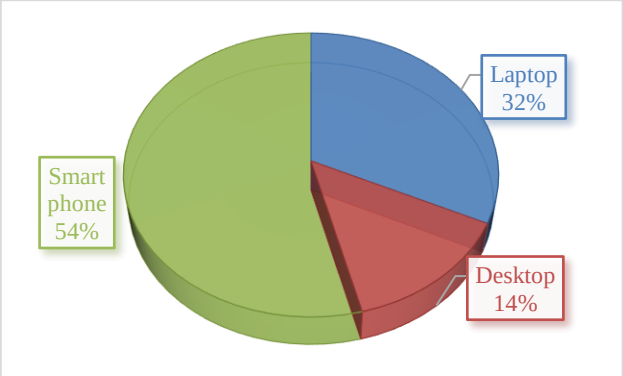

Figure 1: Data regarding devices used by subjects for e-learning.

Majority of the students accessed the online classes by using mobile smart phones (54%) followed by laptop (32%) and desktop (14%). The above explains the usage of mobile smart phone among the majority for purpose of e-learning (Figure 1).

Table 2 explains the results of knowledge assessment among the study subjects in different phases. 68.5% were familiar with e-learning in medical education with majority among (98%) students in phase-4 followed by phase-3 students (78%), phase-2 (54%) and least in phase-1 (44%).

Table 1: Demographic characters of study participants.

Demographic characters	N	%
Age (in years)		
<20	94	47
>20	106	53
Gender		
Male	84	42
Female	116	58
Residence		
Day scholar	74	37
Hostellers	126	63

Regarding accessing the e-learning applications regularly 55% accessed regularly with 84% in phase-4 68% in phase-3 32% in phase-2 and 36% in phase-1.47% of the study subjects were taking tests by e-learning, majority (68%) were in phase-4 and least in phase-1 and phase-2 (28%). 45% of subjects were aware about e-learning websites and were preparing notes from websites.

In both these aspects phase-4 students were majority with 74% and 62% and phase-1 were least with 28 and 18%. 27.5% of subjects were using e-learning only during exams/research or projects only

Table-3 explains the understanding of attitude towards e-learning by 5-point Likert scale. 85% of the subjects agreed that e-learning is a method of electronic learning using internet, 67% agreed that they were already aware of e-learning before joining MBBS, 81% agreed that e-learning definitely improves their overall academic performance and 83% agreed that e-learning improves their self-assessment. 37% only agreed that e-learning improves the standard of teaching and learning than conventional teaching whereas 51% disagreed and 12% were neutral in this. 73% agreed that e-learning has more effective role in medical education while 5% were neutral and 22% disagreed with that. 85.5% agreed e-learning should be supplementary to traditional classroom teaching.

Table 2: Assessing the knowledge of e-learning among study subjects.

S. no.	Questions	Phase 1		Phase 2		Phase 3		Phase 4	
		Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
1	Familiar with e-learning in, medical education	44	56	54	46	78	22	98	2
2	Access the applications of e-learning regularly	36	64	32	68	68	32	84	16
3	Take tests in e-learning	28	72	28	72	64	36	68	32
4	Awareness about e-learning websites	16	84	46	54	54	46	64	36
5	Prepare notes from e-learning websites	28	72	36	64	42	58	74	26
6	Use e-learning regularly	18	82	34	66	50	50	62	38
7	Use e-learning only during exams/projects/research	20	80	24	76	42	58	24	76

Table 3: Assessing the attitude towards e-learning among study subjects.

Questions	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly agree (%)
E-learning is a method of electronic learning using internet	10 (5)	8 (4)	12 (6)	25 (12.5)	145 (72.5)
I am used to e-learning before joining MBBS	24 (12)	22 (11)	20 (10)	33 (16.5)	101 (50.5)
E-learning improves my academic performance	11 (5.5)	8 (4)	19 (9.5)	54 (27)	108 (54)
E-learning improves my self-assessment	14 (7)	10 (5)	10 (5)	54 (27)	112 (56)
E-learning improves the standard of teaching and learning than conventional teaching	54 (27)	48 (24)	24 (12)	40 (20)	34 (17)
E-learning has more effective role in medical education	24 (12)	20 (10)	10 (5)	48 (24)	98 (49)
E-learning should be supplementary to traditional classroom teaching	10 (5)	8 (4)	11 (5.5)	57 (28.5)	114 (57)

Table 4: Comparing the attitude towards e-learning among different phase students.

S. no.	Questions	Response	Phase 1	Phase 2	Phase 3	Phase 4	P value
1	E-learning is a method of electronic learning using internet	Agree and strongly agree	38	40	42	50	<0.001
		Other responses	12	10	8	0	
2	I am used to e-learning before joining MBBS	Agree and strongly agree	20	39	41	34	<0.001
		Other responses	30	11	9	16	
3	E-learning improves my academic performance	Agree and strongly agree	38	39	39	46	<0.001
		Other responses	12	11	11	4	
4	E-learning improves my self-assessment	Agree and strongly agree	34	38	44	50	<0.001
		Other responses	16	12	6	0	
5	E-learning improves the standard of teaching than conventional teaching	Agree and strongly agree	20	18	14	21	<0.001
		Other responses	30	32	36	29	
6	E-learning has more effective role in medical education	Agree and strongly agree	20	32	44	50	<0.001
		Other responses	30	18	6	0	
7	E-learning should be supplementary to traditional classroom teaching	Agree and strongly agree	33	42	46	50	<0.001
		Other responses	17	8	4	0	

Table 5: Satisfaction level of students regarding online classes as per 5-point Likert scale.

S. no.	Parameters	Score 1 (%)	Score 2 (%)	Score 3 (%)	Score 4 (%)	Score 5 (%)
1	Was the class material provided helpful to you	1	5	12	42	40
2	Are you satisfied with practical and theoretical knowledge provided by online lectures	8	10	28	34	20
3	Are you satisfied with professional assistance provided	4	12	28	32	24
4	Are you satisfied with the availability of e-resources	22	12	35	16	15
5	Are you satisfied with interaction and doubt clearing sessions	10	14	35	26	15
6	Are you satisfied with improvement in communication skills attained by e-learning	18	29	20	21	12

Score scale: 1- Strongly dissatisfied; 2- Dissatisfied; 3- Neutral; 4-Ssatisfied; 5- Strongly satisfied.

Table 4 clearly explains that the attitude towards e-learning increases as the phase of the students progresses in the course. A statistically significant correlation was observed with p value<0.001 by comparing agree and strongly agree response with other responses in the study.

Table 5 explains the level of satisfaction attained by students by e-learning on the 6 parameters offered and assessed. With regard to class material provided, 82% were satisfied and only 18% were not satisfied. 54% were satisfied with practical and theoretical knowledge provided by online lectures, 28% neutral and 18% were not satisfied. 56% were satisfied with professional assistance provided, 28% neutral opinion and 165 were not satisfied. 34% were not satisfied with availability of e-resources at the institution, 35% neutral and 31% were satisfied. 41% were satisfied with interaction and doubt clearing sessions, 35% neutral and 24% were not satisfied. 47% were not satisfied with improvement in communication skills attained by e-learning, 20% were neutral and 33% were satisfied.

DISCUSSION

The present study aimed to present an overview of perspectives of e-learning with regard to knowledge, attitude and effectiveness with satisfaction among the medical undergraduate students. With the present change

from existing traditional curriculum to competency based medical education, there is a definite need of commitment, dedication and self-learning attitude by the medical students. The present pandemic has created a worst scenario and normalization of medical education appears far away. Keeping in mind with continuation of medical knowledge to students, online classes were started to undergraduates in all medical colleges.

Majority of the students in our study were above 20 years of age which gives us a perception that most of them are well aware of internet, computers, smart phone technology in browsing internet through electronic gadgets. Smart mobile phone was the commonest device used in our study when compared to laptop and personal desktops for e-learning activity, which is similar to the findings in the study of Chowdhury et al who reported around 85% of students using mobile phones in accessing e-learning. This clearly reports an increasing utilization of smart mobiles in internet-based learning.[5]

In the current study with regard to the knowledge of the students in e-learning, 68.5% were aware of e learning in medical education, 55% were accessing the e-learning websites regularly and 47% were taking regular self-assessments and only 27.5% were using e-learning sites during research/exams or projects. This clearly highlights that students before and during the course attain sufficient knowledge for e-learning. Findings of our study were similar to the findings of Silva et al who also reported that the students attain basic computer literacy during school education which is widely used and developed during the phases of medical curriculum.[6]

Attitudes are probably most developed by human interaction although the principles on which they are based can be learned. In this study, the attitude of medical graduates towards e-leaning was assessed. I our study findings, we found different response from the different phases of students regarding their academic performance, self-assessment, role of e-learning in medical education and in comparing the e-learning with traditional teaching methods. There was statistically significant correlation between agree and not agreed responses Phase wise with different methods in e-learning. In the present study 85.5% agreed e-learning should be supplementary to traditional classroom teaching which was similarly reported in the findings of Kumar et al.[7] Majority of the students reported that their ability to answer assessments in all the formats (MCQ's, SEQ etc.) increased by e-learning and the extent to which they can understand also increased considerably by using various e-learning formats like videos, PPT's, case based scenarios etc. Findings of our study were on par with the findings of Yapa and Ruiz et al.[8,9]

In the present study, the levels of satisfaction were assessed by using 5-point Likert scale and majority were satisfied with clinical material provided, knowledge gained in practical and theoretical aspects by online lectures in various formats and professional assistance provided. However, majority were not satisfied with the availability of internet resources at institutional level, clarifying the doubts sessions, and improvement in communication skills by e-learning. These findings of our study were not correlating with the observations of Kaur et al where majority of the students were satisfied in their study.[10]

CONCLUSION

Our study suggests that, in developing country like India, where many students do not have access to quality education, e-learning can be viewed as a promising tool to improve the accessibility and availability of learning resources by employing cost effective and user-friendly programs. Keeping in mind, the increased complexity of e-learning, it is also proposed that having a team of educationists, technical experts and administrators in each university may prove more beneficial. Students had positive attitude towards e-learning and accepted supplementation of e-learning in regular traditional teaching method.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Singamsetty B, Rajyalakshmi SV. Assessing the knowledge, skills and effectiveness of e-learning among medical graduates amongst the COVID-19 pandemic. Int J Community Med Public Health 2020;7:4833-8.